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Excitation of luminescence by alternating electic field in acridine doped 2-chloroanthracene

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Luminescence has been excited by alternating electric field in acridine doped by 2-chloroanthracene (dopant concentration 10^{-4} mole %) at temperature 300°*K*. Voltage (V_{rms})vs brightness (B) & Frequency (ν) vs. brightness characteristic curves have been plotted. Voltage—brightness relation $B = B_0 \exp(-C/V^{\frac{1}{2}})$ gives better description where B_0 and C are the constants.

1 INTRODUCTION

Electroluminescence in anthracene has been studied by several workers. These investigations involve electroluminescence of intrinsic as well as extrinsic types by (Pott *et al* 1969, Brodzeli *et al* 1970, Schwob *et al* 1971, Wittmer *et al* 1973, Tripathi *et al* 1976) etc Very less attention has been given on the electroluminescent behaviour of other organic semiconducting materials The excitation of luminescence of acridine by alternating electric field has been studied a few years ago by Bernanose *et al*, (1953), but electroluminescence in doped acridine remained almost unexplored. In our present short note some electroluminescent characteristic curves (Voltage vs brightness, and frequency vs. brightness) have been drawn for acridine doped by 2-chloroanthracene (dopant concentration 10^{-4} mole %) at temperature 300°K in araldite. Other details regarding the study of this phosphor will be communicated latter on.

2. EXPERIMENTAL

Chemical 2-chloroanthracene obtained from M/s. Aldrich Chemical company U.S.A and acridine from British Drug House were purified separately (Tripathi *et al* 1976) Condenser shaped cell of thickness about .05mm, with microcrystalline phosphor of acridine doped by 2-chloroanthracene embedded in araldite separated from aluminium electrode by 60 micron thick mica sheet were used for investigation. The cell was excited with an a.c. voltage in the frequency range 20 Hz to 2KHz by a generator coupled with wide band amplifier. The electroluminescence emission from the cell was measured by highly sensitive galvanometer, coupled with RCA, 1P21 photomultiplier tube.

3. Results and Discussions

Figure 1 depicts the variation of brightness (B) with voltage (V_{rms}) The brightness—voltage relation

$$B = B_0 \exp\left(\frac{-C}{V_{rms}}\right) \quad \ldots (1)$$

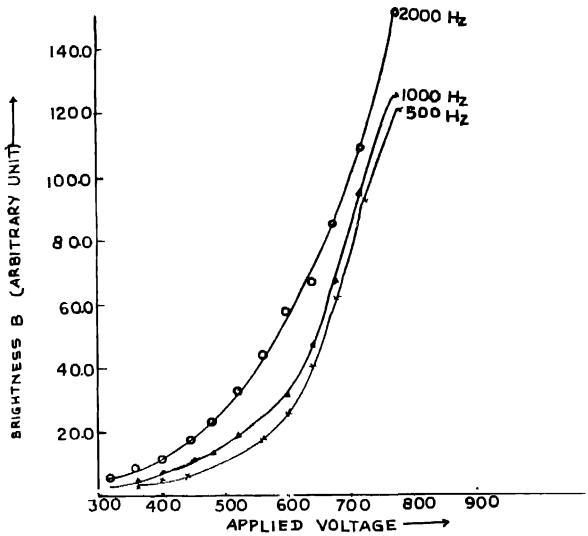

Fig 1 Voltage dependence of brightness at concentration 10^{-4} mole % (in araldite)

gives better description where B_0 and C are the constants and V is the *rms* value of the applied electric field. Figure 2 shows the variation of brightness with log of frequency at different V_{rms} at concentration 10^{-4} mole %. It is clear from the graph that the intensity of light increases with frequency

At the crystal boundary, where Mott Schotky barriers exist, the electrons are tunnelled to the conduction band under the influence of the first few cycle of the applied electric field. These electrons are then radiatively combined with the creative holes in the valence band resulting the light emission.

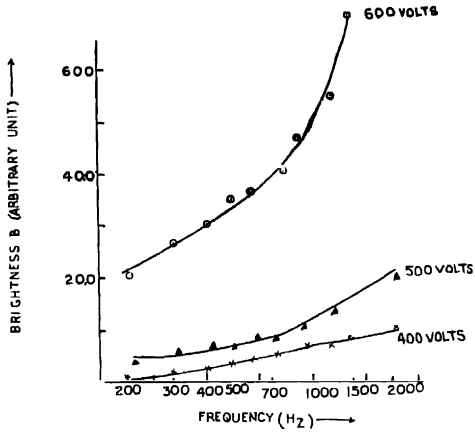

Fig. 2. Frequency dependence of brightness at concentration 10^{-4} mole % (in araldite).

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